CLAIMS

What is claimed is:

1. A communication encoding method, comprising:

obtaining initial binary data having a characteristic Hamming weight;

determining the characteristic Hamming weight of the initial binary data;

performing a comparison of the characteristic Hamming weight of the initial binary data with a predetermined value; and

processing the initial binary data based on the comparison to thereby develop processed binary data having a Hamming weight not less than the characteristic Hamming weight of the initial binary data.

2. The method of claim 1, wherein the characteristic Hamming weight of the initial binary data is determined by counting one-valued bits in the initial binary data.

3. The method of claim 1, wherein the predetermined value is a predetermined minimum Hamming weight threshold value.

4. The method of claim 1, wherein processing the initial binary data comprises bitwise inverting the initial binary data if the Hamming weight of the initial binary data is less than the predetermined value.

5. The method of claim 4, wherein processing the initial binary data further comprises supplying an indication of whether the Hamming weight of the initial binary data is less than the predetermined value.

6. The method of claim 5, wherein the indication comprises a binary digit having a first value if the Hamming weight of the initial binary data is less than the predetermined value and having a second value otherwise.

7. The method of claim 4, wherein processing the initial binary data further comprises supplying an indication of whether bits of the processed binary data are inverted.

8. The method of claim 7, wherein the indication comprises a binary digit having a first value if the bits of the processed binary data are inverted and having a second value otherwise.

9. The method of claim 1, wherein processing the initial binary data comprises performing at least one of error correction coding, run-length encoding, and precoding.

10. The method of claim 9, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

11. A communication encoding method, comprising:

obtaining a first sequence of binary digits that collectively have a characteristic Hamming weight;

inverting each of the binary digits in the first sequence of binary digits if the Hamming weight of the first sequence of binary digits is below a predetermined threshold Hamming weight value; and

providing an indication of whether the binary digits in the first sequence of binary digits have been inverted.

12. The method of claim 11, wherein the characteristic Hamming weight of the first sequence of binary digits is determined by counting one-valued bits in the first sequence of binary digits.

13. The method of claim 11, wherein the indication comprises an indication of whether the Hamming weight of the first sequence of binary digits is below the predetermined threshold Hamming weight value.

14. The method of claim 13, wherein the indication comprises a binary digit having a first value if the Hamming weight of the first sequence of binary digits is below the predetermined threshold Hamming weight value and having a second value otherwise.

15. The method of claim 11, wherein processing the first sequence of binary digits comprises performing at least one of error correction coding, run-length encoding, and precoding.

16. The method of claim 15, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

17. A method of communicating a bitstream having a characteristic Hamming weight to a destination via a channel, the method comprising:

determining the characteristic Hamming weight of the bitstream;

inverting each bit in the bitstream if the characteristic Hamming weight of the bitstream is below a threshold value and developing an indication of whether the bits in the bitstream are inverted;

delivering the bitstream and the indication of whether the bits in the bitstream are inverted to the destination via the channel; and

inverting each bit in the bitstream at the destination if the indication indicates that the bits are inverted.

18. The method of claim 17, wherein the characteristic Hamming weight of the bitstream is determined by counting one-valued bits in the bitstream.

19. The method of claim 17, wherein the threshold value is a predetermined minimum Hamming weight threshold value.

20. The method of claim 19, wherein the indication comprises an indication of whether the Hamming weight of the bitstream is below the threshold value.

21. The method of claim 20, wherein the indication comprises a binary digit having a first value if the Hamming weight of the bitstream is below the threshold value and having a second value otherwise.

22. The method of claim 17, further comprising performing at least one of error correction coding, run-length encoding, and precoding of the bitstream.

23. The method of claim 22, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

24. A method of communicating data from a source to a destination via a channel, the method comprising:

obtaining initial binary data having a characteristic Hamming weight at the source;

determining the characteristic Hamming weight of the initial binary data;

performing a comparison of the characteristic Hamming weight of the initial binary data with a predetermined value; and

processing the initial binary data based on the comparison to thereby develop processed binary data having a Hamming weight not less than the characteristic Hamming weight of the initial binary data;

conveying the processed binary data from the source to the destination via the channel; and

receiving the processed binary data from the source at the destination and regenerating the initial binary data from the processed binary data.

25. The method of claim 24, wherein the characteristic Hamming weight of the initial binary data is determined by counting one-valued bits in the initial binary data.

26. The method of claim 24, wherein the predetermined value is a predetermined minimum Hamming weight threshold value.

27. The method of claim 24, wherein processing the initial binary data comprises bitwise inverting the initial binary data if the Hamming weight of the initial binary data is less than the predetermined value.

28. The method of claim 27, wherein processing the initial binary data further comprises supplying an indication of whether the Hamming weight of the initial binary data is less than the predetermined value.

29. The method of claim 28, wherein the indication comprises a binary digit having a first value if the Hamming weight of the initial binary data is less than the predetermined value and having a second value otherwise.

30. The method of claim 27, wherein processing the initial binary data further comprises supplying an indication of whether bits of the processed binary data are inverted.

31. The method of claim 30, wherein the indication comprises a binary digit having a first value if the bits of the processed binary data are inverted and having a second value otherwise.

32. The method of claim 24, wherein processing the initial binary data comprises performing at least one of error correction coding, run-length encoding, and precoding.

33. The method of claim 32, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

34. A communication decoding method, comprising:

receiving processed binary data including a binary code word and an indication of whether bits of the binary code word are inverted; and

inverting each bit of the binary code word if the indication indicates that the bits are inverted.

35. The method of claim 34, wherein the indication comprises a binary digit having a first value if the bits of the binary code word are inverted and having a second value otherwise.

36. The method of claim 34, further comprising performing at least one of error correction coding, run-length encoding, and precoding of the binary code word.

37. The method of claim 36, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

38. A communication encoding apparatus, comprising:

a data input for receiving initial binary data having a characteristic Hamming weight; and

a processor in communication with the data input for determining the characteristic Hamming weight of the initial binary data, performing a comparison of the characteristic Hamming weight of the initial binary data with a predetermined value, and

processing the initial binary data based on the comparison to thereby develop processed binary data having a Hamming weight not less than the characteristic Hamming weight of the initial binary data.

39. The apparatus of claim 38, wherein processor determines the characteristic Hamming weight of the initial binary data by counting one-valued bits in the initial binary data.

40. The apparatus of claim 38, wherein the predetermined value is a predetermined minimum Hamming weight threshold value.

41. The apparatus of claim 38, wherein the processor bitwise inverts the initial binary data if the Hamming weight of the initial binary data is less than the predetermined value.

42. The apparatus of claim 41, wherein the processor supplies an indication of whether the Hamming weight of the initial binary data is less than the predetermined value.

43. The apparatus of claim 42, wherein the indication comprises a binary digit having a first value if the Hamming weight of the initial binary data is less than the predetermined value and having a second value otherwise.

44. The apparatus of claim 41, wherein the processor further supplies an indication of whether bits of the processed binary data are inverted.

45. The apparatus of claim 44, wherein the indication comprises a binary digit having a first value if the bits of the processed binary data are inverted and having a second value otherwise.

46. The apparatus of claim 38, wherein processing the initial binary data comprises performing at least one of error correction coding, run-length encoding, and precoding.

47. The apparatus of claim 46, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

48. A communication encoding apparatus, comprising:

an input for receiving a first sequence of binary digits that collectively have a characteristic Hamming weight;

a processor for inverting each of the binary digits in the first sequence of binary digits if the Hamming weight of the first sequence of binary digits is below a predetermined threshold Hamming weight value and providing an indication of whether the binary digits in the first sequence of binary digits have been inverted.

49. The apparatus of claim 48, wherein the processor determines the characteristic Hamming weight of the first sequence of binary digits by counting one-valued bits in the first sequence of binary digits.

50. The apparatus of claim 48, wherein the indication comprises an indication of whether the Hamming weight of the first sequence of binary digits is below the predetermined threshold Hamming weight value.

51. The apparatus of claim 50, wherein the indication comprises a binary digit having a first value if the Hamming weight of the first sequence of binary digits is below the predetermined threshold Hamming weight value and having a second value otherwise.

52. The apparatus of claim 48, wherein the processor performs at least one of error correction coding, run-length encoding, and precoding of the first sequence of binary digits.

53. The apparatus of claim 52, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

54. A system for communicating a bitstream having a characteristic Hamming weight to a destination via a channel, the apparatus comprising:

a first processor at a source of the bitstream for determining the characteristic Hamming weight of the bitstream and for inverting each bit in the bitstream if the characteristic Hamming weight of the bitstream is below a threshold value and developing an indication of whether the bits in the bitstream are inverted;

wherein the processor is in communication with the channel to permit delivery of the bitstream and the indication of whether the bits in the bitstream are inverted to the destination via the channel; and

a second processor at the destination and in communication with the channel for receiving the bitstream and the indication and inverting each bit in the bitstream at the destination if the indication indicates that the bits are inverted.

55. The system of claim 54, wherein the first processor determines the characteristic Hamming weight of the bitstream by counting one-valued bits in the bitstream.

56. The system of claim 54, wherein the threshold value is a predetermined minimum Hamming weight threshold value.

57. The system of claim 56, wherein the indication comprises an indication of whether the Hamming weight of the bitstream is below the threshold value.

58. The system of claim 57, wherein the indication comprises a binary digit having a first value if the Hamming weight of the bitstream is below the threshold value and having a second value otherwise.

59. The system of claim 54, wherein the first processor performs at least one of error correction coding, run-length encoding, and precoding of the bitstream.

60. The system of claim 59, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

61. A communication decoder, comprising:

a memory for receiving processed binary data including a binary code word and an indication of whether bits of the binary code word are inverted; and

a processor for inverting each bit of the binary code word if the indication indicates that the bits are inverted.

62. The decoder of claim 61, wherein the indication comprises a binary digit having a first value if the bits of the binary code word are inverted and having a second value otherwise.

63. The decoder of claim 61, further comprising performing at least one of error correction coding, run-length encoding, and precoding of the binary code word.

64. The decoder of claim 63, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

65. A computer-readable medium having stored thereon:

a first set of machine-executable instructions for obtaining initial binary data having a characteristic Hamming weight;

a second set of machine-executable instructions for determining the characteristic Hamming weight of the initial binary data;

a third set of machine-executable instructions for performing a comparison of the characteristic Hamming weight of the initial binary data with a predetermined value; and

a fourth set of machine-executable instructions for processing the initial binary data based on the comparison to thereby develop processed binary data having a Hamming weight not less than the characteristic Hamming weight of the initial binary data.

66. The computer-readable medium of claim 65, wherein the second set of machine-executable instructions determines the characteristic Hamming weight of the initial binary data by counting one-valued bits in the initial binary data.

67. The computer-readable medium of claim 65, wherein the predetermined value is a predetermined minimum Hamming weight threshold value.

68. The computer-readable medium of claim 65, wherein the fourth set of machine-executable instructions bitwise inverts the initial binary data if the Hamming weight of the initial binary data is less than the predetermined value.

69. The computer-readable medium of claim 68, wherein the fourth set of machine-executable instructions supplies an indication of whether the Hamming weight of the initial binary data is less than the predetermined value.

70. The computer-readable medium of claim 69, wherein the indication comprises a binary digit having a first value if the Hamming weight of the initial binary data is less than the predetermined value and having a second value otherwise.

71. The computer-readable medium of claim 68, wherein the fourth set of machine-executable instructions supplies an indication of whether bits of the processed binary data are inverted.

72. The computer-readable medium of claim 71, wherein the indication comprises a binary digit having a first value if the bits of the processed binary data are inverted and having a second value otherwise.

73. The computer-readable medium of claim 65, wherein processing the initial binary data comprises performing at least one of error correction coding, run-length encoding, and precoding.

74. The computer-readable medium of claim 73, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

75. A computer-readable medium having stored thereon:

a first set of machine-executable instructions for obtaining a first sequence of binary digits that collectively have a characteristic Hamming weight;

a second set of machine-executable instructions for inverting each of the binary digits in the first sequence of binary digits if the Hamming weight of the first sequence of binary digits is below a predetermined threshold Hamming weight value; and

a third set of machine-executable instructions for providing an indication of whether the binary digits in the first sequence of binary digits have been inverted.

76. The computer-readable medium of claim 75, wherein the second set of machine-executable instructions determines the characteristic Hamming weight of the first sequence of binary digits by counting one-valued bits in the first sequence of binary digits.

77. The computer-readable medium of claim 75, wherein the indication comprises an indication of whether the Hamming weight of the first sequence of binary digits is below the predetermined threshold Hamming weight value.

78. The computer-readable medium of claim 77, wherein the indication comprises a binary digit having a first value if the Hamming weight of the first sequence of binary digits is below the predetermined threshold Hamming weight value and having a second value otherwise.

79. The computer-readable medium of claim 75, further having stored thereon a fourth set of machine-executable instructions for performing at least one of error correction coding, run-length encoding, and precoding of the first sequence of binary digits.

80. The computer-readable medium of claim 79, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

81. A computer-readable medium having machine-executable instructions stored thereon for communicating a bitstream having a characteristic Hamming weight to a destination via a channel, the machine-executable instructions comprising:

a first set of machine-executable instructions for determining the characteristic Hamming weight of the bitstream;

a second set of machine-executable instructions for inverting each bit in the bitstream if the characteristic Hamming weight of the bitstream is below a threshold value and developing an indication of whether the bits in the bitstream are inverted;

a third-set of machine-executable instructions for delivering the bitstream and the indication of whether the bits in the bitstream are inverted to the destination via the channel; and

a fourth set of machine-executable instructions for inverting each bit in the bitstream at the destination if the indication indicates that the bits are inverted.

82. The computer-readable medium of claim 81, wherein the first set of machine-executable instructions determines the characteristic Hamming weight of the bitstream by counting one-valued bits in the bitstream.

83. The computer-readable medium of claim 81, wherein the threshold value is a predetermined minimum Hamming weight threshold value.

84. The computer-readable medium of claim 83, wherein the indication comprises an indication of whether the Hamming weight of the bitstream is below the threshold value.

85. The computer-readable medium of claim 84, wherein the indication comprises a binary digit having a first value if the Hamming weight of the bitstream is below the threshold value and having a second value otherwise.

86. The computer-readable medium of claim 81, having stored thereon further machine-executable instructions for performing at least one of error correction coding, run-length encoding, and precoding of the bitstream.

87. The computer-readable medium of claim 86, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

88. A computer-readable medium having stored thereon machine-executable instructions for communicating data from a source to a destination via a channel, the machine-executable instructions comprising:

a first set of machine-executable instructions for obtaining initial binary data having a characteristic Hamming weight at the source;

a second set of machine-executable instructions for determining the characteristic Hamming weight of the initial binary data;

a third set of machine-executable instructions for performing a comparison of the characteristic Hamming weight of the initial binary data with a predetermined value; and

a fourth set of machine executable instructions for processing the initial binary data based on the comparison to thereby develop processed binary data having a Hamming weight not less than the characteristic Hamming weight of the initial binary data; and

a fifth set of machine-executable instructions for conveying the processed binary data from the source to the destination via the channel.

89. The computer-readable medium of claim 88, wherein the second set of machine-executable instructions determines the characteristic Hamming weight of the initial binary data by counting one-valued bits in the initial binary data.

90. The computer-readable medium of claim 88, wherein the predetermined value is a predetermined minimum Hamming weight threshold value.

91. The computer-readable medium of claim 88, wherein the fourth set of machine-executable instructions bitwise inverts the initial binary data if the Hamming weight of the initial binary data is less than the predetermined value.

92. The computer-readable medium of claim 91, wherein the fourth set of machine-executable instructions supplies an indication of whether the Hamming weight of the initial binary data is less than the predetermined value.

93. The computer-readable medium of claim 92, wherein the indication comprises a binary digit having a first value if the Hamming weight of the initial binary data is less than the predetermined value and having a second value otherwise.

94. The computer-readable medium of claim 91, wherein the fourth set of machine-executable instructions supplies an indication of whether bits of the processed binary data are inverted.

95. The computer-readable medium of claim 94, wherein the indication comprises a binary digit having a first value if the bits of the processed binary data are inverted and having a second value otherwise.

96. The computer-readable medium of claim 88, wherein the fourth set of machine-executable instructions performs at least one of error correction coding, run-length encoding, and precoding.

97. The computer-readable medium of claim 96, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

98. A computer-readable medium having stored thereon:

a first set of machine-executable instructions for receiving processed binary data including a binary code word and an indication of whether bits of the binary code word are inverted; and

a second set of machine-executable instructions for inverting each bit of the binary code word if the indication indicates that the bits are inverted.

99. The computer-readable medium of claim 98, wherein the indication comprises a binary digit having a first value if the bits of the binary code word are inverted and having a second value otherwise.

100. The computer-readable medium of claim 98, further having stored thereon a third set of machine-executable instructions for performing at least one of error correction coding, run-length encoding, and precoding of the binary code word.

101. The computer-readable medium of claim 100, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

102. A disk drive, comprising:

a data input for receiving initial binary data having a characteristic Hamming weight; and

a processor in communication with the data input for determining the characteristic Hamming weight of the initial binary data, performing a comparison of the characteristic Hamming weight of the initial binary data with a predetermined value, and processing the initial binary data based on the comparison to thereby develop processed binary data having a Hamming weight not less than the characteristic Hamming weight of the initial binary data.

103. The disk drive of claim 102, wherein processor determines the characteristic Hamming weight of the initial binary data by counting one-valued bits in the initial binary data.

104. The disk drive of claim 102, wherein the predetermined value is a predetermined minimum Hamming weight threshold value.

105. The disk drive of claim 102, wherein the processor bitwise inverts the initial binary data if the Hamming weight of the initial binary data is less than the predetermined value.

106. The disk drive of claim 105, wherein the processor supplies an indication of whether the Hamming weight of the initial binary data is less than the predetermined value.

107. The disk drive of claim 106, wherein the indication comprises a binary digit having a first value if the Hamming weight of the initial binary data is less than the predetermined value and having a second value otherwise.

108. The disk drive of claim 105, wherein the processor further supplies an indication of whether bits of the processed binary data are inverted.

109. The disk drive of claim 108, wherein the indication comprises a binary digit having a first value if the bits of the processed binary data are inverted and having a second value otherwise.

110. The disk drive of claim 102, wherein processing the initial binary data comprises performing at least one of error correction coding, run-length encoding, and precoding.

111. The disk drive of claim 110, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

112. A disk drive, comprising:

an input for receiving a first sequence of binary digits that collectively have a characteristic Hamming weight;

a processor for inverting each of the binary digits in the first sequence of binary digits if the Hamming weight of the first sequence of binary digits is below a predetermined threshold Hamming weight value and providing an indication of whether the binary digits in the first sequence of binary digits have been inverted.

113. The disk drive of claim 112, wherein the processor determines the characteristic Hamming weight of the first sequence of binary digits by counting one-valued bits in the first sequence of binary digits.

114. The disk drive of claim 112, wherein the indication comprises an indication of whether the Hamming weight of the first sequence of binary digits is below the predetermined threshold Hamming weight value.

115. The disk drive of claim 114, wherein the indication comprises a binary digit having a first value if the Hamming weight of the first sequence of binary digits is below the predetermined threshold Hamming weight value and having a second value otherwise.

116. The disk drive of claim 112, wherein the processor performs at least one of error correction coding, run-length encoding, and precoding of the first sequence of binary digits.

117. The disk drive of claim 116, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.

118. A communication encoding apparatus, comprising:

obtaining means for obtaining initial binary data having a characteristic Hamming weight;

determining means for determining the characteristic Hamming weight of the initial binary data;

comparing means for performing a comparison of the characteristic Hamming weight of the initial binary data with a predetermined value; and

processing means for processing the initial binary data based on the comparison to thereby develop processed binary data having a Hamming weight not less than the characteristic Hamming weight of the initial binary data.

119. The apparatus of claim 118, wherein the determining means determines the characteristic Hamming weight of the initial binary data by counting one-valued bits in the initial binary data.

120. The apparatus of claim 118, wherein the predetermined value is a predetermined minimum Hamming weight threshold value.

121. The apparatus of claim 118, wherein processing means bitwise inverts the initial binary data if the Hamming weight of the initial binary data is less than the predetermined value.

122. The apparatus of claim 121, wherein processing means further comprises supplying means for supplying an indication of whether the Hamming weight of the initial binary data is less than the predetermined value.

123. The apparatus of claim 122, wherein the indication comprises a binary digit having a first value if the Hamming weight of the initial binary data is less than the predetermined value and having a second value otherwise.

124. The apparatus of claim 121, wherein the processing means further comprises supplying means for supplying an indication of whether bits of the processed binary data are inverted.

125. The apparatus of claim 124, wherein the indication comprises a binary digit having a first value if the bits of the processed binary data are inverted and having a second value otherwise.

126. The apparatus of claim 118, wherein the processing means comprises means for performing at least one of error correction coding, run-length encoding, and precoding.

127. The apparatus of claim 126, wherein a symbol boundary of an encoded symbol does not change relative to error correction coding.